



S4000 *Integrale* Precision Dewpointmeter

A precision dew-point hygrometer for field or laboratory use with the ultimate accuracy, reliability and long-term performance for humidity measurement and calibration

- Dual optics detection system for supreme accuracy and sensitivity
- Easily transportable 3U 19" case design
- Three stage Peltier cooling
- Precision 100 Ω 4 wire platinum resistance thermometer
- Accuracy 0.1 °C dew point
- Dual multi-function LED display with unit indicator
- Current, voltage outputs and RS232 digital communications



may be cleaned with distilled water or a high purity solvent (eg acetone).

ABC cycle time, duration and recovery time can all be adjusted according to the type of application to minimise the effect of contamination risk. The S4000 also features a sophisticated data hold system, which maintains the instrument's signal outputs during an ABC cycle, allowing the S4000 to be used for process control applications.

The Portable Standard

The S4000 *Integrale* Precision Dewpointmeter offers unmatched accuracy and reliability in dew point measurements of air and gas systems and in field use or in calibration laboratories. Its powerful three-stage Peltier thermoelectric heat pump gives a depression capability of more than 80 °C at normal operating temperature. The S4000 *Integrale* can measure and control at dew points (frost points) down to -60 °C. As its name suggests, the S4000 *Integrale* is a fully integrated hygrometer contained in a 19" x 3U bench mounting case that makes it suitable for use in a laboratory environment or as a roving transfer standard.

Contamination Compensation

Any optical system carries a risk of contamination. The S4000 automatically compensates for any such build-up with its ABC (Automatic Balance Compensation) System. ABC ensures continuous optimum operation of the sensor by periodically driving off condensation to allow the optical loop to be re-balanced. When the contamination level is too high the control electronics provide a visible alarm and the sensor optical system

Dual Optics for Supreme Sensitivity

At low frost points the rate of formation of frost on the mirror surface is extremely slow. As a result other cooled mirror hygrometers may give reduced accuracy, poor control stability and extremely long response times at low moisture levels. The S4000 is unique in that it utilises a dual optics detection system that measures both the increase in scattered light intensity and the reduction in reflected light intensity from the mirror surface as frost forms. This greatly increases the sensitivity of the optical loop and response, stability and sensitivity are improved by orders of magnitude at low frost points.

In addition the S4000 *Integrale* can optionally be fitted with Michell's unique speed pipe technology, giving further improvements in response speed at low moisture levels. The

speed pipe concentrates the formation of ice crystals on the mirror surface and can reduce response times by a factor of four times. Typical response times are as follows:

Dew point °C	+10	-20	-50	-60
Response time, minutes	0.5	4	20	40

Unbeatable Measurement Capability

The S4000 *Integrale* uses a highly accurate 4 wire PT100 temperature sensor and has a proven measurement capability of better than 0.1 °C dew point.

Visual Verification

Every S4000 *Integrale* is delivered complete with an M4K Viewing Microscope. Fitting neatly into the sensor viewing port, this

microscope allows the user to confirm the presence of water or ice on the mirror surface.

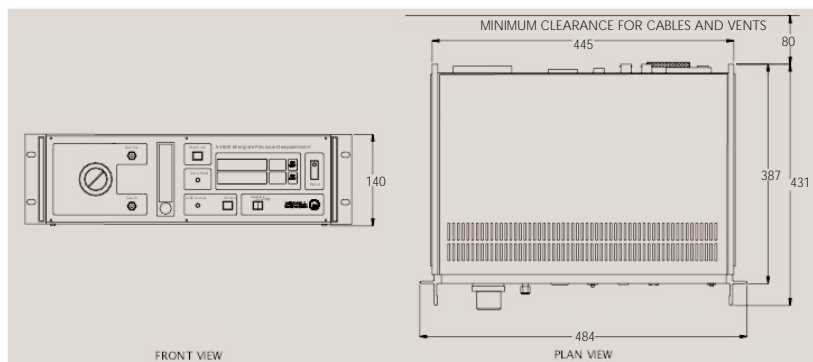
Calibration Integrity

The S4000 is unique amongst dew-point hygrometers. It is the only instrument that is delivered, as standard, with a full UKAS certificate providing official traceability to the UK National Standard. Furthermore, the UKAS certificate is recognised and accepted by all EAL member countries. As an additional benefit, the S4000 has a direct traceability path to the NIST (Washington DC, USA) National Humidity Standard. No other hygrometer provides such comprehensive traceability to a worldwide network of standards organisations. That's why the S4000 is used by so many of these very organisations as part of their own humidity referencing systems.

Technical Specifications

Display Units	Dual 6 digit LED, with 2 digit eng. unit indicators °C, °F dew point; °C, °F temp; % rh, ppm _v , ppm _w , gm ⁻³ , gkg ⁻¹ , ppm _w for SF ₆
Resolution	0.01 for all units
Accuracy	±0.1 °C dew point (typical system accuracy)
Response speed	0.5 °C s ⁻¹ + settling time (dew point dependent)
Sensitivity	0.01 °C
Repeatability	Better than 0.1 °C
Auxiliary input (optional)	Pressure transducer 4-20 mA input for automatic pressure compensation. Range = 0 to 344.0 kPa absolute (0-50 psia)
Sensor pressure	1 MPa (max)
Sample flow rate	0.05 to 0.2 Nlmin ⁻¹ (recommended)
Integrated flowmeter	0 to 0.5 Nlmin ⁻¹ (dual scale air and SF ₆)
Measurement principle	Fundamental cooled (chilled) mirror, optical detection. Primary cooling: 3-stage Peltier heat pump
Dual optics detection system	Wide band red LED with dual photo sensors, all quartz insulated

Outputs: analogue digital	10 mV/°C dew point, 4-20 mA RS232; data hold, ABC status, optics alarm (logic)								
Temp measurement	Four wire 1/10 DIN 100Ω platinum resistance thermometer								
Measurement range	- 60 to +40 °C dew point								
	<table border="1"> <thead> <tr> <th>Ambient Temp</th> <th>Lowest Dew Point</th> </tr> </thead> <tbody> <tr> <td>+10 °C</td> <td>-60 °C</td> </tr> <tr> <td>+20 °C</td> <td>-55 °C</td> </tr> <tr> <td>+35 °C</td> <td>-45 °C</td> </tr> </tbody> </table>	Ambient Temp	Lowest Dew Point	+10 °C	-60 °C	+20 °C	-55 °C	+35 °C	-45 °C
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+20 °C	-55 °C								
+35 °C	-45 °C								
Operating temp	0 to +40 °C (recommended)								
Storage temp	-10 to +50 °C								
Auxiliary cooling	Integral fan								
Sensor housing type	Integral bench unit (19" mounting standard, carry handle optional)								
Dimensions	484W x 431D x 140H mm								
Weight	9.8 kg								
Power supply	90 to 265 V AC; 50-60 Hz (monitor) 90 to 265 V AC (sensor)								



Dimensions mm



0179



Q6284

